

RECEIVED
CENTRAL FAX CENTER

APR 23 2007

Appl. No.: 10/718,436

Amdt. Dated April 23, 2007

Response to Office Action Mailed January 22, 2007

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in this application.

1. (Currently Amended) An automatic tracking apparatus for a reflector comprising:

a surveying machine body;

an illumination portion disposed in said surveying machine body for illuminating a measurement light toward a reflector;

a light receiving portion which is disposed in said surveying machine body and which has an image sensor for receiving a reflection light image of the measurement light illuminated toward said reflector;

an arithmetic means portion for calculating a position of the reflection light image from said reflector in an area of said image sensor based on a received light of said image sensor;

a rotation mechanism for rotating said surveying machine body in horizontal and vertical directions so as to position said reflector on a light receiving optical axis of said light receiving portion based on the position obtained by said arithmetic means portion;

a storing portion for storing a quantity of light at each pixel in said image sensor; and

an edge position detecting portion for detecting a beginning edge position and an end edge position of said reflection light image at each scanning line in said image sensor.

~~wherein said arithmetic means calculates the quantity of light at each pixel from said storing portion in accordance with an output of said edge position detecting portion and calculates positions of the weighted average in horizontal and vertical directions of said reflection light image from a horizontal pixel position and a vertical pixel position~~

wherein said automatic tracking apparatus reads out the quantity of light at each pixel from said storing portion, and obtains a width between said beginning edge position and said end edge position at each scanning line after calling out the positions from said edge position detecting portion, and decides the scanning line corresponding to the widest line as the position of the weighted average in the horizontal direction, and calculates the position of the weighted average in the vertical direction of the reflection light image based on the quantity of light of the pixel which exists between said beginning edge position and said end edge position in the scanning line corresponding to the widest line.

2. (Cancelled).

3. (Currently Amended) An automatic tracking apparatus for a reflector comprising:

a surveying machine body;

an illumination portion disposed in said surveying machine body, for illuminating a measurement light toward a reflector;

a light receiving portion which is disposed in said surveying machine body and which has an image sensor for receiving the measurement light from said reflector;

an arithmetic means portion for calculating ~~calculates~~ a position of a reflection light image from said reflector in an area of said image sensor based on a received light of said image sensor;

a rotation mechanism for rotating said surveying machine body in horizontal and vertical directions so as to position said reflector on a light receiving optical axis of said light receiving portion based on the position obtained by said arithmetic means portion;

a first storing portion for storing a quantity of received light of the measurement light from said reflector in scanning; and

a second storing portion for storing said quantity of received light after binarizing,

~~wherein said arithmetic means detects the position of said reflection light image from the quantity of received light which is stored in said first storing portion and the quantity of received light which is binarized and stored in said second storing portion~~

wherein said automatic tracking apparatus reads out the quantity of light at each pixel from said first storing portion and said second storing portion, and obtains a width between said beginning edge position and said end edge position at each scanning line after calling out the positions from said edge position detecting portion, and decides the scanning line corresponding to the widest line as the position of the weighted average in the horizontal direction, and calculates the position of the weighted average in the vertical direction of the reflection light image based on the quantity of light of the pixel which exists between said beginning edge position and said end edge position in the scanning line corresponding to the widest line.

4. (New) An automatic tracking apparatus for a reflector according to claim 1, further comprising a distance measuring light illumination portion for illuminating a distance measuring light toward said reflector,

wherein said automatic tracking apparatus drives said rotation mechanism according to the calculated position of the weighted average to rotate said surveying machine body so as to face said reflector and performs distance determination according to a reflected distance measuring light reflected from said reflector.

5. (New) An automatic tracking apparatus for a reflector according to claim 4, wherein said distance measuring light has a wave length different from that of said measurement light.

6. (New) An automatic tracking apparatus for a reflector according to claim 3, further comprising a distance measuring light illumination portion for illuminating a distance measuring light toward said reflector,

wherein said automatic tracking apparatus drives said rotation mechanism according to the calculated position of the weighted average to rotate said surveying machine body so as to face said reflector and performs distance determination according to a reflected distance measuring light reflected from said reflector.

7. (New) An automatic tracking apparatus for a reflector according to claim 6, wherein said distance measuring light has a wave length different from that of said measurement light.